Memo

To: Kristina Tong, Olivia Romano, and Gail Terzi (USACE), Kate Thompson (Ecology), Karla Kluge (City of Tacoma), Matt Curtis (WDFW), Scott Sissons (Pierce County), Kimberly Owens and Chan Pongkhamsing (USEPA),

From: Mark Rettmann

CC: Dave Myers, Bill Rehe, Tony Warfield (Port of Tacoma)

Date: August 31, 2015

RE: Additional Riprap and Streambed Cobble Placement
Upper Clear Creek Mitigation Site (UCCMS) Project

This memorandum presents justification for placement of additional heavy loose riprap and streambed cobble during construction of the Upper Clear Creek Mitigation Site (UCCMS). Initial estimates called for 500 tons (313 CY) of riprap and 610 tons (381 CY) of cobble. According to the construction contractor (Active Construction, Inc. [ACI]), the actual quantities required to construct the project totaled approximately 600 tons (375 CY) of riprap and 1,200 tons (750 CY) of cobble. The increased quantities are attributed to underestimating the planned quantity of necessary cobble and additional quantities of both materials needed during construction to realign the existing channel east of the Burlington Northern Santa Fe (BNSF) railroad and to build channel deflector structures in unconsolidated substrates of the existing Clear Creek channel. Specifics regarding the need for additional riprap and cobble are discussed in more detail below.

Initially, the quantity of cobble was underestimated by 440 tons (275 CY) because it did not fully take into account the buried extents necessary to construct the pool-forming cobble structures and the base layer beneath coir wrap embankments. Based on a reevaluation of project plans and details, the revised planned estimate of cobble for the project is approximately 1,050 tons (656 CY).

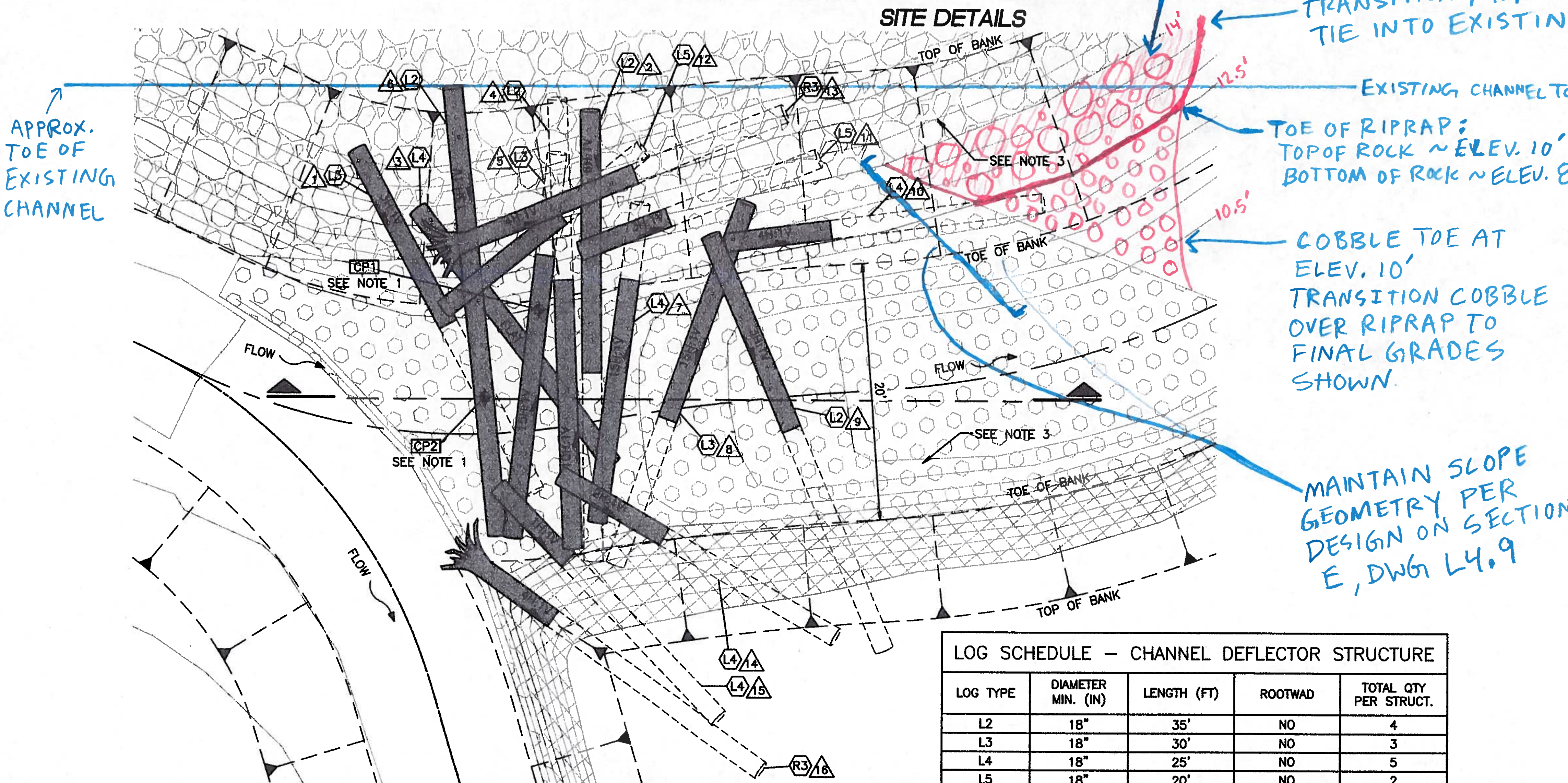
An additional approximate 35 tons (22 CY) of riprap and 40 tons (25 CY) of cobble was necessary to address a Request for Information (RFI) that ACI submitted to the Port of Tacoma (Port). The construction plans excluded riprap and cobble from an area directly north of channel deflector structure 11-2 where the existing channel was realigned further east of the BNSF railroad embankment. ACI expressed difficulty installing riprap that only extends part way down the proposed left (west) bank slope to an elevation of 14 feet. Stable placement of riprap to this elevation would be difficult without additional riprap placement that extends to the proposed channel bed elevation of 10.5 feet (to support the upper material placement). Furthermore, by not adding riprap in this area, there was a risk of erosion at this location during high flows which could lead to bank failure. To address these constructability issues, the design plans were revised to include placement of additional riprap and cobble (see attached revisions to Drawing L4.2 and cross section E from Drawing L4.9).

An additional approximate 65 tons (41 CY) of riprap and 110 tons (69 CY) of cobble was necessary within the existing Clear Creek channel to account for initially placed materials that submerged into unconsolidated substrate. Due to the unaccounted loss of material into existing substrate, additional materials were necessary to achieve design elevations during construction of the left bank adjacent to the BNSF railroad and both channel deflector structures.

Therefore, approximately 100 tons (63 CY) of additional riprap and 590 tons (369 CY) of additional cobble was placed to construct the UCCMS for a project total of approximately 600 tons (375 CY) of riprap and 1,200 tons (750 CY) of cobble. These revisions will be reflected on the project as-built survey and will be documented in the as-built report.

UPPER CLEAR CREEK MITIGATION SITE

SITE DETAILS



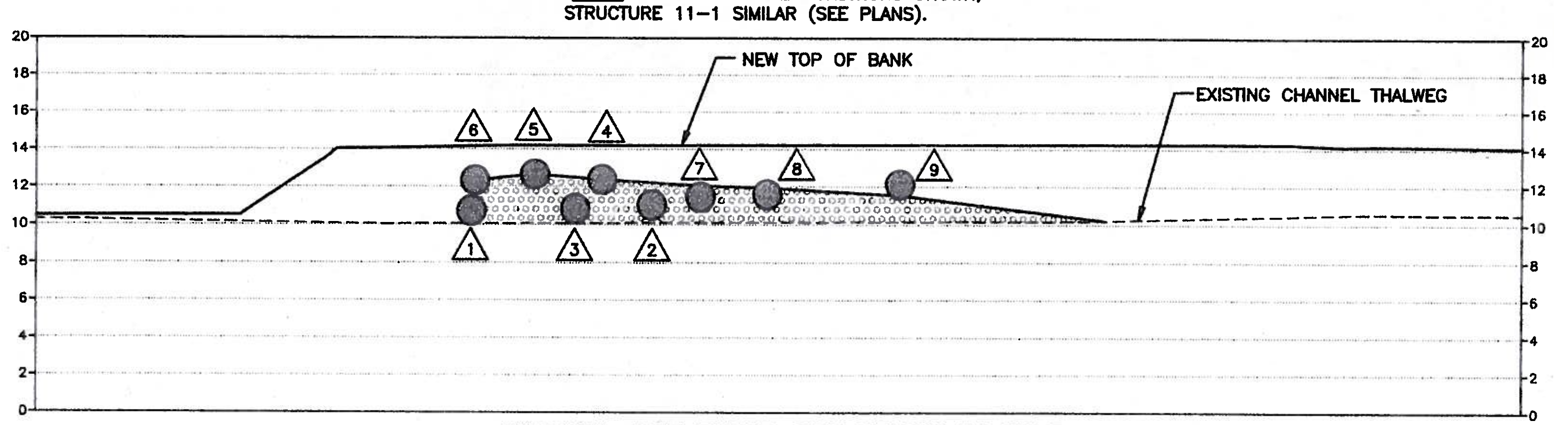
CHANNEL DEFLECTOR STRUCTURE PLAN VIEW*

*NOTE: STRUCTURE 11–2 CONDITIONS SHOWN, STRUCTURE 11–1 SIMILAR (SEE PLANS).

LOG SCHEDULE – CHANNEL DEFLECTOR STRUCTURE				
LOG TYPE	DIAMETER MIN. (IN)	LENGTH (FT)	ROOTWAD	TOTAL QTY PER STRUCT.
L2	18"	35'	NO	4
L3	18"	30'	NO	3
L4	18"	25'	NO	5
L5	18"	20'	NO	2
R3	18"	30'	YES	2

CHANNEL DEFLECTOR STRUCTURE CONTROL POINTS

CONTROL POINT (CP#) AT	NORTHING	EASTING	ELEVATION (FEET)
STRUCTURE 11-1 CP1	695280.66	1172774.08	11.20
STRUCTURE 11-1 CP2	695277.34	1172783.51	10.08
STRUCTURE 11-2 CP1	694845.92	1172928.41	12.48
STRUCTURE 11-2 CP2	694843.91	1172935.97	12.19



CHANNEL DEFLECTOR STRUCTURE PROFILE

11 CHANNEL DEFLECTOR STRUCTURE DETAILS

SCALE : 0 5' 10'
GRAPHIC SCALE

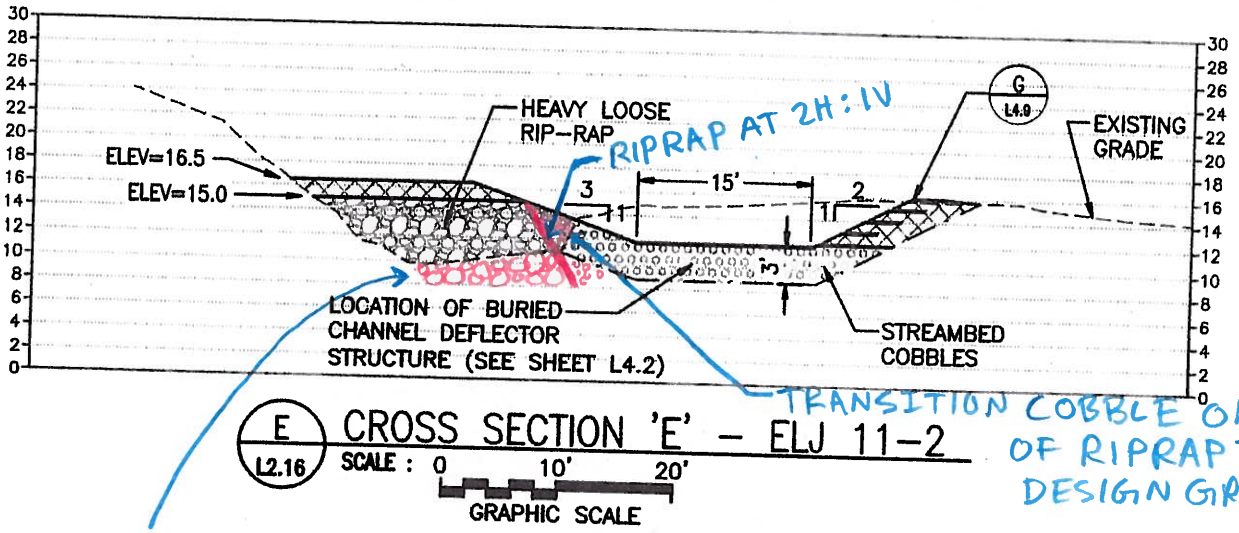
LEGEND:

- PARTIALLY EMBEDDED LOG SYMBOL (EXPOSED / EMBEDDED)
- L1 — KEY LOG TYPE ID (LOG TYPE L1)
- 3 — LOG PLACEMENT SEQUENCING ORDER
- CP1 — STRUCTURE CONTROL POINT (1)
- 3V:1H — LOG SLOPE DIRECTION (DOWN)
- EXISTING GRADE
- FINAL GRADE
- EXCAVATION LIMITS
- STRUCTURE BACKFILL MATERIALS PLACEMENT
- COIR WRAP EMBANKMENT PLACEMENT (SEE NOTE 3)
- STREAMBED COBBLE MATERIALS PLACEMENT (SEE NOTE 3)
- HEAVY LOOSE RIP–RAP MATERIALS PLACEMENT (SEE NOTE 3)
- EXISTING SUBSTRATE

NOTES:

1. EXTENTS OF EMBEDDED LOG PORTIONS SHOWN ARE APPROXIMATE AND WILL VARY FOR EACH STRUCTURE.
2. EXCAVATION LIMITS SHOWN ARE APPROXIMATE AND WILL VARY BASED ON CONSTRUCTION MEANS AND METHODS, SUBSURFACE CONDITIONS AND LOCATION OF STRUCTURE. CONTRACTOR SHALL ADJUST EXCAVATION LIMITS AS NECESSARY TO COMPLETE CONSTRUCTION.
3. SEE SHEETS L1.10 (STRUCTURE 11–1), AND L1.14 AND L1.16 (STRUCTURE 11–2) FOR LOCATIONS AND EXTENTS OF COIR WRAP EMBANKMENT, STREAMBED COBBLES, AND HEAVY LOOSE RIP–RAP MATERIALS PLACEMENT.

Port of Tacoma
HERRERA
BRUCE DEES & ASSOCIATES
MARK: | REVISION: | BY: | APPR: | DATE:
IAN B. MOSTRENKO, STATE OF WASHINGTON, 36069, REGISTERED PROFESSIONAL ENGINEER 5/9/2014
APPROVED: CHIEF ENGR 5-12-14 | DATE | CHECKED BY | DATE | PROJ. ENGR | DATE
PRINTED BY: sjensen May 09, 2014
PORT ADDRESS: ONE SITCUM PLAZA TACOMA, WA 98401–1837
UPPER CLEAR CREEK MITIGATION SITE
SITE DETAILS
TOWNSHIP: 20 N | RANGE: 3 E | SECTION: 14
DAT–HRZ: NAD83/07 | VERT: MLLW (SEE NOTES ON SV2.0)
PARCEL: 0320141001(&1086) | DRAWING SCALE: AS NOTED
L4.2
SH 92 OF 100
CONT/CONS: 069593
M. ID: 098127
PHASE: BID SET


HEAVY LOOSE RIP-RAP
RIPRAP AT 2H:1V
G
L4.9
EXISTING GRADE
ELEV=16.5
ELEV=15.0
3
1
15'
1
2
LOCATION OF BURIED CHANNEL DEFLECTOR STRUCTURE (SEE SHEET L4.2)
STREAMBED COBBLES
TRANSITION COBBLE ON TOP OF RIPRAP TO DESIGN GRADE (3H:1V)
E
L2.16
CROSS SECTION 'E' - ELJ 11-2
SCALE : 0 10' 20'
GRAPHIC SCALE
RIPRAP MAY PRESS DOWN TO ELEV. ~ 8' IN EXISTING SUBSTRATE